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When the bulb of a thermometer, wrapped in fine lint, has been dipped in the sulphureous liquor, if it be simply exposed to the air it sinks to about zero of Fahrenheit's scale, although by a similar evaporation of ether the cold produced is not below  $20^{\circ}$ .

If a thermometer, coated as before, and wetted with the sulphuret, be placed in the receiver of an air-pump, a cold of  $65^{\circ}$  or  $70^{\circ}$  below  $0^{\circ}$  is easily obtained, by a vacuum which supports one fourth of an inch of mercury; and if the air-pump can exhaust as far as one eighth of an inch, the thermometer sinks to  $-81^{\circ}$  or  $-82^{\circ}$  in less than two minutes, even though the thermometer at the commencement of the experiment was as high as  $70^{\circ}$  above 0.

Hence the freezing of mercury is an experiment that may be performed at any time, and with no more apparatus than a common air-pump, and enough of the sulphuret to moisten the bulb of a thermometer. Since sulphuric acid has no affinity for the sulphuret, it has no effect in adding to the degree of cold produced upon the principle upon which that is employed by Mr. Leslie, excepting in so far as it removes any moisture that may be present in the air, and which in some measure impedes the process until it is converted into a hoar frost, that may be seen adherent to the bulb of the thermometer.

*On a saline Substance from Mount Vesuvius.* By James Smithson, Esq. F.R.S. Read July 8, 1813. [*Phil. Trans.* 1813, p. 256.]

From the strong evidence we have that a very large proportion of the world, as we now see it, has at some period been either in a state of actual combustion, or has felt the effects of heat, a high interest, says the author, attaches itself to volcanoes and their ejections, as partial instances of similar operations now going on.

In support of the igneous origin of primitive strata, it is observed, not only that no *crystal* imbedded in them contains water, but that none of the *materials* of the strata contain water in any state.

The subject of the present experiments was thrown out in a liquid state from the cone of Vesuvius about the year 1792 or 1793.

It was of a dirty white colour, with streaks of yellow and green.

When heated, it fused without any loss of weight. When fused on charcoal, it was converted into sulphuret of potash.

In water it dissolved readily, leaving particles of specular iron and oxide of copper. Muriate of platina caused a copious precipitate from the solution, from the presence of potash. Nitrate of barytes afforded an abundant precipitate of sulphate of barytes.

Sulphate of silver gave a curd-like precipitate, showing the presence of muriatic acid.

Prussiate of soda gave a red precipitate, consisting of prussiate of copper. Carbonate, or oxalate of soda or potash, occasioned no precipitation of any kind of earth; nor did any means employed detect the presence of boracic, or of any other acid, excepting the sulphuric and muriatic.

By a suitable course of experiment, the proportions of the several salts present were found to be nearly thus :

Sulphate of potash.....	71
Sulphate of soda.....	19
Muriate of soda .....	5

the remainder consisting of a little muriate of ammonia, mixed with the muriates of iron and copper.

In the part which remained undissolved by water, there was also found to be submuriate of copper, similar in composition to the green sand of Peru, and a yellow powder that was judged to be submuriate of iron ; so that, on the whole, this single mass presented as many as nine different species of matter.

*Some Experiments and Observations on the Substances produced in different chemical Processes on Fluor Spar. By Sir Humphry Davy, LL.D. F.R.S. V.P.R.I. Read July 8, 1813. [Phil. Trans. 1813, p. 263.]*

In the Bakerian lecture for 1808, the author had supposed fluor acid to be decomposed when potassium is heated in silicated fluoric acid gas, and that oxygen was separated from it ; an inference which had also been drawn from a similar experiment by Messrs. Gay-Lussac and Thenard. But when he afterwards found that oxymuriatic acid could not be decomposed, and that no oxygen could be separated from the compounds of this body with phosphorus, sulphur, or the metals, he was led to conceive an analogy between the oxymuriatic and fluoric compounds, an analogy also suggested to him by M. Ampere.

The experiments described in the present paper are principally guided by this analogy, with a view to ascertain whether it is well founded.

The subjects of experiment are silicated fluoric gas, originally discovered by Scheele. Liquid fluoric acid in its concentrated state, first obtained by Messrs. Gay-Lussac and Thenard, and the fluo-boric acid of the same chemists.

When these compounds are acted upon by potassium or sodium, the results are fluates of potash or soda, with silicum, hydrogen, or boron, according to the compound operated upon.

With regard to these results, there are three hypotheses which may be maintained. One is, that fluoric acid consists of an inflammable base united to oxygen. A second, that it consists of a simple base, which may be called fluorine (analogous to chlorine), united with hydrogen. A third is, according to the tenets of the phlogistians, that fluoric acid, like metallic oxides, is liable to combine with hydrogen, and form an inflammable compound. Since all the phenomena may be explained according to any one or other of these hypotheses, the sole question is, which of these explanations is best, as being most conformable to the general series of chemical facts with which we are at present acquainted.